Original Article

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Functional Outcome of Prone and Direct Posterior Approach for Management of Posterior Column Tibial Plateau Fracture

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Abstract

Introduction: Due to its special location, it is difficult to perform open reduction and internal fixation, if early effective treatment is not provided for patients, chronic collapse often occurs, which leads to significant limited range of knee flexion and extension. It is pivotal to find an approach with more accurate exposure of fracture and more operable fixation to obtain better outcome of treatment for PTPF. *Aim:* to evaluate the outcome of prone and direct posterior approach for management of posterior column tibial plateau fracture in terms of clinic radiological and functional outcome. *Material and methods:* Prospective hospital based descriptive study conducted in Department of Orthopedics in teaching hospitals attached to SMS Medical College and Hospital from January 2017 to May 2018, on 36 subjects. Patients were seen for clinical and radiological assessment at 15 days, 3rd month and 6th months interval and outcome analysed by Lysholm score, Tegner score and RUST criteria for radiological union. *Observation:* There was a significant increase in the scores 1.17 ± .97; p <0.001S in *Tegner score between* 3 month and 15 days. Significant improvement (6.00 ± .93; p <0.001S) was observed in score on applying paired-samples t- to compare *Lysholm Score between* 6 month and 15 daysThere was a significant increase in the RUST criteria *between* 6 month and 3 month scores 3.47 ± 1.44; p < 0.001S. These results suggest that operation really effective for improvement of the disease conditions. *Conclusion:* Using the prone posterior approach with a reverse L-shaped incision to manage fragments of the posterior column in tibial condylar fractures can achieve anatomic reduction and rigid fixation, resulting in a good functional outcome by buttressing the posteromedial fragment by plate and buttress effect preventing descent of the fragment under load than other modes of fixation.

Keywords: Prone posterior approach; Tibial condylar fractures; Lysholm Score; RUST criteria

Introduction

Posterior column fracture is an uncommon type of tibial plateau, not well described by AO and Schatzker classification systems.[1]

Due to its special location, it is difficult to perform open reduction and internal fixation, if early effective treatment is not provided for patients, chronic collapse often occurs, which leads to significant limited range of knee flexion and extension. It is pivotal to find an approach with more accurate exposure of fracture and more operable fixation to obtain better outcome of treatment for PTPF. Since the fracture line of PTPF is located at the back, the conservative anterior-lateral approach cannot fully expose fracture[2], which results in ineffective internal fixation

There were 5 types of PTPFs identified in the new classification system: posteromedial split fracture (type I), posterolateral split fracture (type II), posterolateral depression fracture (type III), posterolateral split and depression fracture (type IV), and posteromedial split combined with posterolateral depression fracture (type V).

These fracture are some time associate with ACL avulsion fracture, PCL avulsion fracture and posterolateral corner injuries.These fracture pattern, however, is inherently unstable and difficult to adequately reduce and stablize by conventional technique and approaches.[3–5]

A reduction problem is often faced during posteromedial or posterolateral displacement of the tibial fragment under knee flexion. The supine position with a posteromedial or posterolateral approach requires extensive dissection for reduction purposes. Furthermore, the biomechanical principles of management of these fractures require placement of a posterior anti-glide buttress plate. Therefore, the posteromedial fragment sometimes cannot be optimally treated by conventional anterior, medial, or posteromedial approaches in the supine position[6].

A conventional vertical incision of the posteromedial collateral ligament and detachment of the medial capsule and medial head of gastrocnemius from the medial femoral condyle are required for full exposure of the posteromedial facet. Posterior approaches, such as described by Trickey in the 1960s, are more demanding and involve dissection of the neurovascular bundle [7, 8]. To overcome these problems, Galla and Lobenhoffer described a direct posteromedial approach for managing Moore type I tibial head fracture-dislocations.[9] Propose study may conducted for evaluation of outcome of prone and direct posterior approach for management of posterior column tibial plateau fracture in terms of clinic radiological and functional outcome

Methodology

The Prospective hospital based descriptive study conducted in Department of Orthopedics in teaching hospitals attached to SMS Medical College and Hospital from January 2017 to May 2018, till the sample size achieved (whichever is earlier) Sample size was calculated 36 subjects at 95% confidence limit and 4% absolute allowable error. Inclusion Criteria was as follows-Patients with unstable posterior plateau fracture. Patients of age group of 18 to 65 years Patients who are fit for surgery anaesthesia, Patients giving written informed consent for the study. Patients with pathological fracture, Patients with pre existing arthritis compromising knee function and with associated polytrauma and same limb fracturewere excluded. After obtaining clearance and approval from the institutional ethical committee and patients fulfilling the inclusion/exclusion criteria will be included in the study after obtaining informed consent Detailed history was obtained using the study proforma with special attention to mechanism of injury Examination of other associated symptoms was based on history and clinical examination. 36 cases suffering from posterior tibial plateau fracture. History, Clinical examination–systemic and local, Radiological evaluation using-X-ray, Computerized tomography and other imaging modalities, Investigations-baseline and others, Diagnosis-clinical and radiological Surgery-open reduction internal fixation with buttress t plate, Routine antibiotics and analgesic/anti-inflammatory drugs, Post operative evaluation by clinical examination and X-ray, Assessment of complications *Perioperative*-difficulty in reduction, hypotension, neurovascular injury. *Immediate Post operative*-pulmonary embolism, fat embolism, infection, nerve palsy *Late post operative*-infection, non union, malunion, failed fixation

Imaging

Radiography

Anteroposterior and lateral X-Rays of knee were taken to know the fracture pattern. In the AP view, 15° caudal tilt view clearly shows the articular surface depression and split than the standard AP view.

Oblique views detect minor degrees of joint impaction and fracture line more clearly Traction views are useful in severely comminuted and displaced fracture

Tibial plateau view

Technique and x ray picture. CT Scans help to classify the fracture, guide pre-operative planning and decide the choice of treatment. MRI scans are very useful in assessing associated soft tissue injuries such as status of cruciate ligaments and menisci. Likewise, tears of lateral collateral or medial collateral ligaments can be detected.

Preoperative Management

On admission patients were started on an i.v. line and fluids infused. Analgesics were given i.m. The injured limb was temporarily immobilized in slab and X-ray taken. Anteroposterior, lateral, right oblique and left oblique views were taken. Manual traction was used where appropriate. CT scans were taken routinely to assess three-dimensional fracture geometry. GT slab and limb elevation were done. Skin over fracture was closely watched. Those presenting with severe soft tissue edema or blisters were taken up for surgery only after the appearance of—wrinkle sign.

Surgical Procedure

Patients were thoroughly investigated, affected knee was prepared. Surgery was done under spinal anaesthesia. All patients were given Inj. Ceftrixone 1g IV preoperatively as routine prophylaxis. Patient was placed in prone position, with folded pillow under knee to allow knee flexion.

Fracture fixation

After reduction of the *articular surface*, further reduction of the broken posterior cortex was accomplished through the placement of a 3.5 mm small fragment anti-glide buttress T-plate. Reduction was achieved by direct compression by the buttress plate. Inserting the screw just below the fracture site first optimized reduction, followed by tight screwing of the other holes one by one. It was important to visualize the distal bone spike as well as the previously exposed proximal fracture line at the metaphyseal and articular (submeniscal) level to assess anatomical reduction. After intraoperative checking of the fracture and *joint stability*, the various layers were closed over one or two *suction* drains.

Postoperative evaluation

Patients were seen for clinical and radiological assessment at 15 days, 3rd month and 6th months interval and outcome analysed by Lysholm score, Tegner score and RUST criteria for radiological union.

Reduction quality of the articular surface was evaluated from lateral plain film and was categorized as anatomic (0 mm step-off), acceptable (< 2 mm step-off) or poor (2–4 mm step-off). Union was defined as no fracture site pain reported by the patient and no fracture gap on last radiographic evaluation

Every follow up pain, range of knee motion and angular deformity was measured. Check x-ray also taken. Data obtained were filled in the proforma.

Excellent	If the patient felt no pain, knee flexion >110^o, and the patient returns to his or her original work.
Good	If the patient felt no pain, knee flexion 90^o–110^o and return to work.
Fair	Moderate pain, knee flexion <90^o, pain on walking long distance changed to lighter work.
Poor	Moderate to severe pain, knee flexion <60, walking with crutches.

Assessment

Functional assessment was done using Lysholm score and Tegner score. Radiological assessment was done by using Rust Criteria.

Lysholm Knee Scoring Scale

Section 1 - LIMP

- I have no limp when I walk. (5)
- I have a slight or periodical limp when I walk. (3)
- I have a severe and constant limp when I walk. (0)

Section 2 - Using Cane or Crutches

- I do not use a cane or crutches. (5)
- I use a cane or crutches with some weight-bearing. (2)
- Putting weight on my hurt leg is impossible. (0)

Section 3 - Locking Sensation in The Knee

- I have no locking and no catching sensation in my knee. (15)
- I have catching sensation but no locking sensation in my knee. (10)
- My knee locks occasionally. (6)
- My knee locks frequently. (2)
- My knee feels locked at this moment. (0)

Section 4 - Giving Way Sensation from the Knee

- My knee gives way. (25)
- My knee rarely gives way, only during athletics or vigorous activity. (20)
- My knee frequently gives way during athletics or other vigorous activities. In turn I am unable to participate in these activities. (15)
- My knee frequently gives way during daily activities. (10)
- My knee often gives way during daily activities. (5)
- My knee gives way every step I take. (0)

Section 5 – Pain

- I have no pain in my knee. (25)
- I have intermittent or slight pain in my knee

during vigorous activities. (20)
- I have marked pain in my knee during vigorous activities. (15)
- I have marked pain in my knee during or after walking more than 1 mile. (10)
- I have marked pain in my knee during or after walking less than 1 mile. (5)
- I have constant pain in my knee. (0)

Section 6 – Swelling

- I have no swelling in my knee. (10)
- I have swelling in my knee only after vigorous activities. (6)
- I have swelling in my knee after ordinary activities. (2)
- I have swelling constantly in my knee. (0)

Section 7 – Climbing Stairs

- I have no problems climbing stairs. (l0)
- I have slight problems climbing stairs. (6)
- I can climb stairs only one at a time. (2)
- Climbing stairs is impossible for me. (0)

Section 8 – Squatting

- I have no problems squatting. (5)
- I have slight problems squatting. (4)
- I cannot squat beyond a 90 deg. Bend in my knee. (1)
- Squatting is impossible because of my knee. (0)
- Total: __________/100

Score

a) < 65 poor
b) 65–83 fair
c) 84–90 good
d) >90 excellent

TEGNER activity level

10. Competive sports
    - Soccer—national or international level
9. Competive sports
    - Soccer—lower divisions Ice hockey Wrestling Gymnastics
8. Competitive sports
    - Bandy Squash or badmination Atheletic (jumping) Down-hill skiing
7. Competitive sports
    - Tennis Athletics (running) Motoross Hnadball, basketball Orineteering

   Recreational sports
    - Soccer Bandy, Ice hockey Squash Athletics (jumping) Cross-country track Orienteering
6. Recreational sports
    - Tennis or badminton Handball or basketball Downhill skiing Jogging, at, least 5 times weekly
5. Competitive sports
    - Bicycling Cross-country skiing

   Recreational sports
    - Jogging on uneven ≥ 2 times weekly

   Work
    - Heavey labor (eg, building, forestry)
4. Recreational sports
    - Bicycling Cross-country skiing Jogging oneven ground ≥ 2 time weekly

   Work
    - Moderately heavy work (eg lorry driving)
3. Competitive and recreational sports
    - Swimming Walking in rough forest terrain

   Work
    - Light labor
2. Work
    - Light work

   Walking on uneven ground
1. Work
    - Sedentary work

   Walking on even ground
0. Sick leave or disability pension because of knee problems

RUST criteria for radiological union

	Radiographic	
Score per Cortex[a]	**Callus**	**Fracture Line**
1	Absent	Visible
2	Present	Visible
3	Present	Invisible

[a]The individual cortical scores (anterior,posterior,medial, and lateral) are added to provide an overall RUST value ranging from 4 (ie, definitely not healed) to 12 (ie, definitely healed) for a set of radiographs.
Adapted with permission from koositra BW, Dijkman BG, Busse JW, Sprague S, Schemitsch EH, Bhandari M: The radiographic union scale in tibial fractures: Reliability and validity. J Orthop Trauma 2010;24(suppl 1):S81-S86.

Results

Theyoungest patients in this study at the time of sustaining injury was 19 year old and oldest was 59 year. The mean age in the study was 37.72 year. Males were effected more as compare to female. Majority of patients (86.11%) have RTA as the mode of injury followed by assault and slip and fall. In this study, right leg affected more than left leg (R>L) (Table 1).

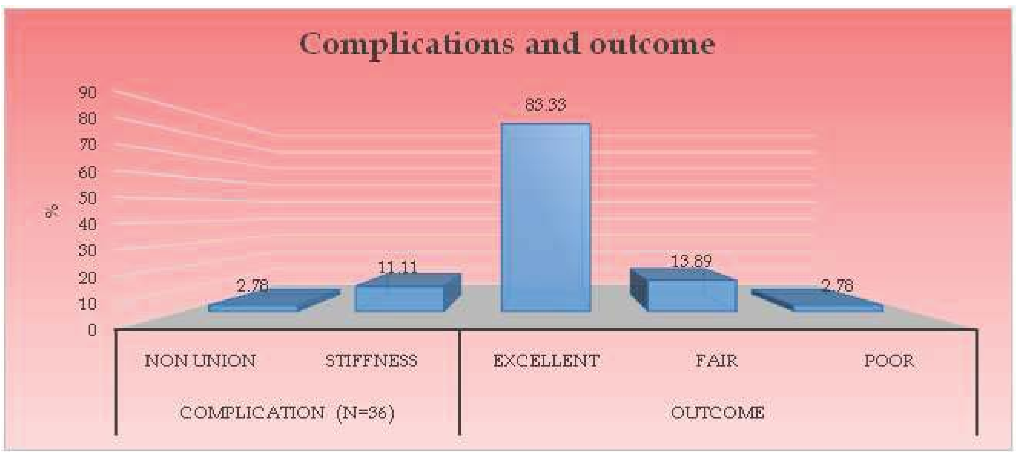

Fig. 1:

Table 1: Demographic profile of the study population

		Number	Percentage
	Total	36	100
Age Group	<20	1	2.78
	21 to 30	11	30.56
	31 to 40	11	30.56
	41 to 50	6	16.67
	51 to 60	7	19.44
	Mean ±SD (min, max)	37.72 ± 12.11 (19 to 59)	
Gender	Female	7	19.44
	Male	29	80.56
MOI	Assault	3	8.33
	Road Traffic Accident	31	86.11
	Slip & fall	2	5.56
Side of injury	Left	11	30.56
	Right	25	69.44
Post operative reduction	Acceptable	9	25
	Anatomic	27	75

Table 2: Range of Motion at different follow up period

	Number	%	Number	%	Number	%
	15 Day		3 Month		6 Month	
0–65	1	2.778	0	0	0	0
0–75	5	13.89	0	0	0	0
0–80	5	13.89	2	5.56	0	0
0–85	6	16.67	1	2.78	1	2.78
0–90	12	33.33	1	2.78	1	2.78
0–95	5	13.89	0	0	1	2.78
0–100	2	5.556	2	5.56	0	0
0–105	4	11.11	0	0	1	2.78
0–110	7	19.44	0	0	0	0
0–115	8	22.22	0	0	0	0
0–120	8	22.22	0	0	5	13.89
0–125	3	8.333	0	0	11	30.56
0–130	0	0	0	0	12	33.33
0–135	0	0	0	0	2	5.556
5–100	0	0	0	0	1	2.778
5–140	0	0	0	0	1	2.778

Table 3:

		Minimum	Maximum	Mean	SD
At 15 days	Lysholm score	0	16	4.57	5.38
	Tegner score	0	1	0.31	0.47
At 3 months	Lysholm Score	65	88	79.58	5.04
	Tenger score	0	3	1.47	0.84
	Radiological Evaluation (RUST criteria)	4	8	6.31	0.75
At 6 months	Lysholm score	75	98	92.64	4.49
	Tengner score	5	8	6.31	0.79
	6 m Radiological Evaluation (RUST criteria)	4	12	9.78	1.38

Table 4: Paired Differences between at different follow up periods

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
3 m–15 d Paired Samples Test of Lysholm Score	75.03	6.26	1.06	72.88	77.18	70.89	34	<0.001S
6m-15d	88.09	6.5	1.1	85.85	90.32	80.17	34	<0.001S
3 m Tenger score - 15 D = Tegner score	1.17	0.97	0.16	0.84	1.5	7.21	36	<0.001S
6 m Tengner score - 15 D = Tegner score	6	0.93	0.15	5.69	6.31	38.88	36	<0.001S
6 m Radiological Evaluation (RUST criteria) - 3 m Radiological Evaluation (RUST criteria)	3.47	1.44	0.24	2.98	3.96	14.43	36	<0.001S

Out of 36 patients, 27 have anatomic(0 mm step off) and 9 have acceptable (<2 mm step off) reduction. out of 36 patients 31 patients have >120° flexion and 5 have <110° flexion. This study reveal that 11.11% patient have stiffness and 2.78% patient have non union complication. 83.33% patients showing excellent, 13.89% fair and 2.78% poor result (Fig. 1). At 15 days Lysholm score mean 4.57and SD 5.38 and Tegner score mean .31 and SD 0.47. At 3 months Lysholm score mean 79.58 and SD 5.04, Tegner score mean 1.47 and SD 0.84 and RUST criteria mean 6.31 and SD 0.75. At 6 months Lysholm score mean 92.64 and SD 4.49, Tegner score mean 6.31 and SD 0.79 and RUST criteria mean 9.78 and SD 1.38 (Table 2).

There was a significant increase 75.03 ± 6.26 in the *Lysholm Score between* 3 month and 15 days p <0.001S These results suggest that operation really effective for improvement of the disease conditions. Significant improvement was observed in score on applying paired-samples t- to compare *Lysholm Score between* 6 month and 15 days. There was a significant increase in the scores 88.09 ± 6.50; p <0.001S These results suggest that operation really effective for improvement of the disease conditions. The Tegner Score. Pair 1 (3 month - 15 days) 1.47 mean .84 SD and .31 mean .47 SD, pair 2 (6 month - 15 days) 6.31 mean .79 SD and .31 mean .47 SD (Table 3).

There was a significant increase in the scores 1.17 ± .97; p <0.001S in *Tegner score between* 3 month and 15 days.These results suggest that operation really effective for improvement of the disease conditions. Significant improvement (6.00 ± .93; p <0.001S)was observed in score on applying paired-samples t- to compare *Lysholm Score between* 6 month and 15 days. There was a significant increase in the scores These results suggest that operation really effective for improvement of the disease conditions. The RUST criteria. Pair 1 (3 month) 6.3 mean .7 SD and 4.57. pair 2 (6 month) 9.8 mean 1.4 SD. (Table 4)

There was a significant increase in the RUST criteria *between* 6 month and 3 month.scores 3.47 ± 1.44; p <0.001S These results suggest that operation really effective for improvement of the disease conditions.

Discussion

Posterior tibial plateau fracture is a relatively uncommon injury, with an incidence of 28.8% (Bhattacharyya T, *et al*. 2005)[8] in proximal tibial plateau fracture. This kind of fracture appears confusing on initial radiographs because of the small displacement, so it is a special injury pattern that is not sufficiently included in any type of the classification systems. Proper analysis of the lateral radiograph and CT scans clarifies the fracture pattern and allows planning of appropriate treatment. There are controversies over surgical approaches and fixation methods for PTPF, because it is difficult to reduce and stabilize the injury through conventional strategies.

The treatment of PTPF remain debated in the literature, and there is less consensus on the relative merits posterior platting.

In our study we fixed the posterior tibial plateau fracture with posterior plate, the goal of operative treatment for PTPF were anatomic reduction, especially in restoration of articular congruity, stable fixation for early rehabilitation and avoidance of complication, particularly infection and non union. In our study, we included a series of 36 PTPF, which were all followed up for at least 6 months.

The mean age of patients in our plating group was 37.72 years at the time of surgery. 77.77% was in age group 18–50 years from plating group respectively; this implies that the majority of the patients were economically productive. The high incidence of fractures in young patients highlights the high energy mechanism of injury. Other studies have shown a similar mean age in their series whish are : Sangwan SS *et al*. [10] (2002) as 35.5 years, Kataria H *et al*. [11] (2007) as 32 years. All these studies highlight the gloomy fact that the knee injuries affect predominantly the productive age group and leave an enormous economic burden on the financial health of the nation.

The most common mode of injury in our study was Road traffic accident in 86.11% of cases, followed by assault 8.33 % and slip and fall 5.56% cases respectively. Sangwan SS *et al*.[10] (2002) similarly found 84% cases, Kataria H *et al*.[11] (2007) 76% Zahid *et al*.[12] (2010) 71% cases. High energy tibial condyle fractures caused by road traffic accidents because of increase no vehicles and introduction of high velocity high ways. In our study right knee was involved in 69.44%.

For comminuted three-column tibial plateau fractures, several approaches have been described for exposure of posteromedial or posterolateral split fractures. These standard techniques have in common the problem of an extensive approach with incision of the posteromedial ligament, detachment of the medial capsule and the medial gastrocnemius muscle from the femoral condyle, and the potential requirement for detachment of the hamstrings to achieve adequate exposure and reduction of the fracture.[5,13] Supine approaches for posterolateral fracture are described by Solomon *et al*.[6] with a transfibular approach. This approach requires detaching the peroneus longus tendon from the fibular head, and osteotomy is needed. Complications entailed by this approach are iatrogenic common peroneal palsy and non-union of the fibular head. Numerous authors advocated using a posterior approach in dealing with posterior column fractures. Bhattacharyya *et al*.[3] presented the results of 13 patients with tibial plateau fracture-dislocations with large posteromedial fragments (Moore type I), treated via a variant of the posterior approach This approach entails great risk of neurovascular damage, as extensive dissection is required.[9] Lobenhoffer described a posterior approach in 1997[5] and modified it in 2003 with Gall. This approach is used by many surgeons, allowing less dissection and direct access to posteromedial fractures.

Luo *et al*.[6] first introduced a computed tomography-based "three-column fixation" concept and evaluated clinical outcomes (using a column-specific fixation technique) for complex tibial plateau fractures. They reported a "floating position", based on lateral decubitus with the lower leg rotated into a prone position when the posterior approach to the tibial plateau is performed. We extended the concept of fixing the posterior column by the posterior approach using a "direct prone position". This direct posterior approach can optimize the reduction and fixation of posterior column fractures with both PM and PL fragments.

The strong points of the prone posterior approach are as follows. First, identification of tibial subluxation in tibial condylar fractures is critical. Second, adequate reduction of tibial posteromedial condylar fractures can reduce postoperative tibial subluxation. The posteromedial fragment of the fracture can be easily reduced with hyperextension of the knee in the prone position. Third, after reduction of the posteromedial fragment, an antiglide plate is applied for adequate and rigid fixation in tibial fracture subluxation or dislocation. Prone positioning of the patient facilitates both fracture reduction and placement of an antiglide buttress plate.[14] After reduction, the posteroanterior direction screws more easily achieve a buttress effect. The main disadvantage of this approach is that patients with head, chest or abdomen injuries cannot easily be monitored in the prone position and may not tolerate it well.

In this study functional and radiological outcome in displaced tibial plateau fractures with posterior column involvement of 36 patients treated by posterior plate osteosynthesis with antiglide plating with interfragmentary screws through the upper hole of the antiglide plate if needed and it was combined with or without lateral support with 6.5 mm cancellous screws or plate osteosynthesis.

In our study mean interval between surgery and partial weight bearing 9.45 weeks. Early weight bearing stimulates fracture healing by axial micro motion without shear and allows retention of muscular strength. Causes of delayed partial weight bearing were mainly due to other associated bony injuries which require prolonged non weight bearing. In Sangwan SS *et al*.[10] series average time gap between operation and partial weight bearing was 8.92 weeks. In Zahid *et al*.[12] series partial weight bearing was started at 12 weeks.

In our study mean interval between surgery and full weight bearing was 12.11 weeks. In Tao *et al.*[15] 2008 full weight bearing was started at 13 weeks. In He *et al*.[16] full weight bearing was started at 13.8 weeks.

In our study mean range of motion was 122.5° (range 75°–130°) flexion and extension 0° at 24 week. In Tao *et al*.[15] Mean range of motion at the final follow-up was 2°of extension (range 0°–5°), and mean flexion was 125° (range 95°–135°). In Lin *et al*.[17] avarage range of motion was extension of 3º(5–10º) and flexion of 135º (100º–145º). In Chandele *et al*.[18] range of motion >130º was achieved in 29 patients with rest of the three patients between 110º to 130º (Table 2).

The mean Lysholm score in our study at the time of last follow up was 92.66 ± 4.5 (75–100). 83.33% patients shows excellent lysholm score(>90). The mean Tegner score in our study was 6.31 ± 0.79 (5–8). In Tao *et al*.[15] the mean postoperative HSS at the final follow-up was 93 (S.D. 3.67, Range 84–97). In Lin *et al*.[17] median Lysholm score was 95 (75–100) and the mean Tegner activity score was 6 (5–8). In Chandele *et al*.[18] functional outcome was assessed using Oxford knee score which was excellent in 29 patients and good in rest of the three.

In our study mean time of bony union 12.5 weeks (9–14 week). In Tao *et al.*[15] bony union occurred at a mean of 12 weeks (range, 9–14). In He *et al*.[16] bony union time was 11.5 weeks (10–14 weeks).

In our study the complication was stiffness in 4 cases (11.11%) and non union in 1 case (2.78%). In Tao *et al*.[15] None of the complications occurred such as deep infection, necrosis of the skin incision or the loosening and breakage of the internal fixator. In He *et al*.[16] None of the complications such as infection, necrosis of the skin incision or the loosening and breakage of the internal fixator occurred. In Lin *et al*.[17] No cases of deep infection were observed.

In a study conducted by Zhi *et al*.[19] Luo *et al*.[6] on tibia bone model, Posteromedial T plate can improve the strength and stiffness of posteromedial fragment fixation and had a buttress effect preventing descent of the fragment under load than other modes of fixation (anteroposterior lag-screws, an anteromedial limited contact dynamic compression plate (LC-DCP), a lateral locking plate). Hence, reduce the varus collapse and increase in range of movements by fixing the unstable posterior fragments. No patient developed varus collapse in our study.

In our study also all the fractures were united between 3 to 4 months. 83.33% patients had excellent outcome, 13.89% patients had fair outcome, 2.78% patients had poor radiological outcome with poor clinical outcome.

Limitations to the present study was the sample size too small and the follow-up was not long enough to address posttraumatic arthritis. Some cases did not have postoperative CT scanning to accurately quantify articular reduction and fixation. There was no control group in our series.

Conclusion

Using the prone posterior approach with a reverse L-shaped incision to manage fragments of the posterior column in tibial condylar fractures can achieve anatomic reduction and rigid fixation, resulting in a good functional outcome by buttressing the posteromedial fragment by plate and buttress effect preventing descent of the fragment under load than other modes of fixation.

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